

PROJECT DESCRIPTION

Red Lodge Drilling Investigation - Red Lodge, Montana Montana Department of Environmental Quality

June 19, 2014

Pioneer Technical Services, Inc. (Pioneer) is conducting this investigation for the Montana Department of Environmental Quality (DEQ). The primary objective is to gather information to evaluate subsurface conditions and assess the condition of abandoned underground coal mine tunnels and pillars in the vicinity of several homes within the City of Red Lodge, Montana. This information will be utilized to assess the potential of mine-induced subsidence. Historic mine maps indicate there are two levels of mine workings under most of the proposed borehole locations. Eight boreholes will be drilled through the abandoned mine workings. The depth to the mine workings and bedrock quality immediately above and below the workings are critically important components of the investigation. The proposed locations for the bore holes are shown in the attached Figure 1. The anticipated depths are listed in Table 1.

The drilling work will be performed in two phases:

- Phase I drilling work will involve drilling through the upper 100 feet (approximate) of gravels and boulders to bedrock and installing a temporary steel casing.
- Phase II drilling will involve a different type of drill rig which will set up over the steel casing to core the under-lying bedrock. Core samples collected from this work will be used to evaluate the occurrence or potential for subsidence due to collapsed mine workings. This work will also verify the presence, location, and condition of mine workings or coal seams.

The drilling phases will likely occur concurrently, with Phase II work starting as soon as the first casing is installed.

Table 1: Estimated Depths for Core Drilling

HOLE	TOTAL DEPTH	6" STEEL CASING*	BED ROCK TO MINE NO. 1.5**	MINE NO. 1.5 TO 50' BELOW**	BED ROCK TO MINE NO. 4**	MINE NO. 4 TO MINE NO. 5**	MINE NO. 5 TO 50' BELOW**
				(FT)			
BH-01	458	100			196	106	56
BH-02	413	100			179	78	56
BH-03	700	100			387	156	57
BH-04	700	100			383	159	58
BH-05	693	100			372	165	56
BH-06	784	100			470	158	56
BH-07	590	100			283	151	56
BH-08	269	100	113	56			
TOTALS	4607	800	113	56	2270	973	395

* Estimated depth of steel casing based on previous drill holes.

** Estimated depths to mine workings based on historic mine maps.

Pioneer will oversee all drilling activities. Drillers will be responsible for protection of all existing features in the vicinity of drilling operations, containment and disposal of all drilling fluids and cuttings, safety, and traffic control. Work hours will be 8 AM to 6 PM, Monday through Saturday, with no work on Sunday. The drilling work will begin no earlier than August 4, 2014 and is expected to last approximately 6 weeks.

Contact persons include the following:

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